H. C. Rawlinson, F.R.S., late President Royal Geographical Society.
W. B. Baskcomb.
James K. Shuttleworth.
Geo. Busk, F.R.S.
Geo. J. Allman, F.R.S., President of the Linnean Society.
J. Arthur Phillips.
T. H. Huxley, Sec. R.S.
E. Ray Lankester, F.R.S.
H. C. Sorby, F.R.S., President of the Royal Microscopical Society.
W. T. Thiselton Dyer, Assistant-Director, Royal Gardens, Kew.
Henry W. Acland, F.R.S., President of Medical Council.
H. W. Chisholm, Warden of the Standards.
D. T. Ansted, M.A., Cant., F.R.S.
J. H. Gladstone, F.R.S., Fullerian Professor, Royal Institution.
J. Scott Russell, F.R.S.
A. Lane Fox, Colonel, F.R.S.
Rayleigh, F.R.S.
Robert S. Ball, LL.D., F.R.S., Astronomer Royal, Ireland.
H. C. Seddon, Major, R.E.
Charles V. Walker, F.R.S., President of the Society of Telegraphic Engineers.
Joseph Whitworth, F.R.S.
G. Carey Foster, F.R.S., President of the Physical Society.
Balfour Stewart, F.R.S.
R. B. Clifton, F.R.S., Professor of Experimental Philosophy, Oxford.
W. F. Barrett, Prof. Physics, Royal College of Science, Dublin.
J. Norman Lockyer, F.R.S.
Francis Galton, F.R.S.
J. Cameron, F.R.S., Major-General, Director Ordnance Survey.
M. Foster, F.R.S.
E. A. Schäfer.
B. Samuelson, M.P.
E. Klein, F.R.S.
W. N. Hartley.
Francis Guthrie, LL.B.
P. Martin Duncan, F.R.S., President of the Geological Society.
P. L. Sclater, F.R.S.
J. E. Davis, Capt. R.N., Hydrographic Department, Admiralty.
H. Dent Gardner.
John Allan Brown, F.R.S.
William Hackney.
Ettrick W. Creak, Staff Commander, R.N.
W. H. Preece.
W. Chandler Roberts, F.R.S.
A. B. Kempe, B.A., Barrister-at-Law, Western Circuit.
Alex. Crum Brown, Professor of Chemistry, Edinburgh University.
James Dewar, Professor of Mechanism, Cambridge.
Urban Pritchard, M.D.
R. H. M. Bosanquet, M.A., F.R.A.S., F.C.S., Fellow of St. John's College, Oxford.
Sydney H. Vines.
Alfred E. Fletcher.
Herbert M'Leod, Prof. of Experimental Science, Indian C.E. College.
Alex. B. W. Kennedy, C.E., Prof. Engineering, University College.
Arch. Geikie, F.R.S., Director, Geological Survey, Scotland.
Cornelius B. Fox, M.D., F.M.S.
Nicholas Brady, M.A.
Thomas Stevenson, F.R.S.E., F.G.S., M. Inst. C.E.
John Jellett, D.D., F.R.S.
Thomas Pigot, Prof. Engineering, Royal College of Science, Dublin.
J. P. O'Reilly, Prof. Mineralogy and Mining, Royal College of Science, Dublin.
T. Lauder Brunton, M.D., F.R.S.
J. E. H. Gordon.
W. Galloway, Prof. Chemistry, Royal College of Science, Dublin.
Henry E. Armstrong, F.R.S.
Thomas Andrews, LL.D., F.R.S., President of the British Association.
James Thomson Bottomley, M.A., F.R.S.E.
W. F. Donkin.
Claude R. Conder, Lieut. R.E.
Charles E. De Rance, F.G.S., H.M. Geological Survey.
Nathl. Barnaby, Chief Constructor of the Navy.
W. Topley.
J. Clerk Maxwell, F.R.S., Prof. of Experimental Physics in University of Cambridge.
G. G. Stokes, Sec. R.S. Lucasian Professor, Cambridge.

NOTES

THE current number of the *Fortnightly Review* contains an article by Dr. Bridges, in which he tries to prove that Harvey did not discover the circulation of the blood by vivisection. Harvey's own statements are so explicit, and the methods he employed have been so often expounded, that there is little new to be said on the point. Harvey, as Dr. Bridges admits, discovered the true functions of the heart, and inferred the existence of the complete systemic circulation by observations on living animals, interpreting the facts observed by aid of the faculty of reasoning. Malpighi demonstrated the capillary part of the circulation by other observations on living animals, dealing with his new facts by aid of the same faculty. But to say that the movements of the heart were discovered by vivisection and the brains of Harvey, but the circulation of the blood "by the microscope of Malpighi" is as absurd as to ascribe the glory of the former discovery to Harvey's scalpel and that of the other to Malpighi's brains.

THE following are the numbers of visitors to the Loan Collection of Scientific Apparatus during the week ending July 15:—Monday, 3,464; Tuesday, 3,300; Wednesday, 602; Thursday, 495; Friday, 451; Saturday, 3,403; total, 11,715. During the present week 13 demonstrations of apparatus were given on Monday, 11 on Tuesday, 5 on Wednesday; 6 are to be given to-day, 5 on Friday, and 5 on Saturday.

THE annual meeting of the Helvetic Society of Natural Sciences will take place at Basle, on August 20–23. Scientific men of all countries are cordially invited to the meeting; and those who wish to make any communication are requested to write, before August 1, to Dr. H. Christ, 5, Bäumleingasse, Basle.

THE Scientific Societies of Belgium held their first united Congress at Brussels this week, from the 16th to the 18th. The following, we learn from the *Society of Arts Journal*, are some of the subjects which have been discussed:—Greater facilities for the transmission of scientific objects; as to the opening of public scientific institutions at convenient hours, and especially in the evening; the organisation of libraries and scientific collections in the towns and communes; the publication of elementary treatises on various branches of science; establishment at one of the littoral towns of a collection of works concerning the coast; a study of the geological formation of the district round Brussels; the part played by molluscs in nature; the malacological zones of Belgium. On the 18th there was to be a scientific excursion into the environs of Brussels.

AT a meeting of the Council of the Yorkshire College of Science, held last Friday, an offer by Mr. George Salt, of 150*l.* a year for three years as a temporary provision for a professorship of Biology, was accepted, Mr. Salt's stipulation that Mr.

L. C. Miall, F.G.S., be appointed professor being also agreed to. Mr. Miall will also deliver a short course of lectures annually at Bradford.

We rejoice to hear that *L'Explorateur* was mistaken in announcing the death of Dr. Petermann. The French journal seems to have been led astray by the death of Prof. A. H. Petermann, the distinguished orientalist.

On Saturday, July 8, the French and Swiss Alpine Clubs met together at Giromagny, to ascend a number of mountains in the French Vosges; a number of interesting observations were made.

The Awards made by the Council of the Institution of Civil Engineers for original communications during the Session 1875-76, have just been announced. Fifteen out of twenty-three communications have been rewarded, including a Telford medal and premium for "Motion of Light Carriers in Pneumatic Tubes," by Prof. W. C. Unwin, B.Sc. Telford premiums have been bestowed for "Movement of Air in Pneumatic Tubes," by C. Bontemps; "Pneumatic Transmission of Telegrams," by R. S. Culley and R. Sabine; "Floods in England and Wales in 1875," by G. J. Symons; "Evaporation and Percolation," by C. Greaves; "Tidal Changes in the Mersey," by J. N. Shoolbred, B.A. The Miller Scholarship of the value of 40*l.* a year for three years was gained by the Hon. R. C. Parsons, B.A., for an inquiry into the "History and Theoretical Laws of Centrifugal Pumps."

Mr. W. Vivian, of Mwyndy, Llantrissant, Glamorganshire, sends us the following instance of a joint-stock concern in the poultry yard. Two hens sat on, or by, one nest, and thus between them hatched one chick. They have since, for some weeks been parading the yard, each clucking and manifesting all the anxiety and care of a true mother over this one. The hens never quarrel, or show the least appearance of jealousy or rivalry.

A meeting of the West Riding Geological and Polytechnic Society was held at Settle on Wednesday week. The meeting was well attended, and Mr. Tiddeman gave an excellent address on the history, method of working, and the results that have been brought to light by the exploration of the Victoria Cave, Settle.

Further particulars have been published concerning Gessi's circumnavigation of Lake Albert Nyanza. He found it 140 miles broad by 50 wide. No river of importance enters it, the south end is shallow, and the lake seems subject to violent storms. The true Nile, after leaving the lake south of Duflé about 100 miles, splits into two branches, one of which goes to Duflé and Gondokero, the other, the natives say, goes far inland. Colonel Gordon had no news of Stanley on May 2, but expects he went across from Victoria Lake, saw the south end of Albert Lake, and has got into a nest of lakes, which, Colonel Gordon thinks, exist between the Albert and the Tanganyika.

We have received the Proceedings of the American Oriental Society for May and November, 1875, and May, 1876. At these meetings many valuable papers on the department with which the society is connected, were read; among these is one by Prof. W. D. Whitney replying to some criticisms of his work by Prof. Max Müller.

The Paris Society of Agriculture and Insectology has asked from the Municipal Council of Paris, whose zeal for instruction is laudable, the grant of a piece of ground at Montsouris for the purpose of establishing a model apiary, a botanical collection of all plants likely to be of use in feeding bees, a model establishment of sericiculture, and a collection of all trees likely to be of use in feeding silkworms. The request is to be granted on condition that the establishment be open free to the pupils of the several municipal schools.

Satisfactory accounts are given of the boring of the shaft for the Channel Tunnel. A depth of 80 yards has been reached, and no fault has been observed from which any difficulty may be expected in the execution of the Tunnel.

Violent shocks of earthquake were felt again on the 5th inst. at Corinth and the surrounding district. The direction of the motion was east to west. Shortly after noon on Monday an earthquake occurred in Vienna. Three violent shocks, lasting two seconds, were felt. A panic ensued. Several houses are damaged, and a portion of the old walls has been split.

We have received the Forty-second Annual Report of the York School Natural History, Literary, and Polytechnic Society. This must surely be the oldest School Society in the kingdom. The Report, of only four pages, shows that a considerable amount of work has been done in the various departments with which the Society deals, and we should think that the Society is an important element in the educational means of the school.

The Twelfth Annual Report of the Lewes and East Sussex Natural History Society states that the Society is numerically and financially in good condition. The Society is doing a fair amount of good field-work, and contemplates the publication of lists of the fauna and flora of East Sussex.

The *Geographical Magazine* for July contains a paper, with maps, by Mr. Ravenstein, exhibiting some interesting conclusions as to the birthplace and migrations of the populations of the British Isles, drawn from the census tables. The magazine also contains some important statistics on Danish Greenland, furnished by Dr. Rink, a paper on the Andaman Islands, an account of Schweinfurth and Güssfeldt's recent journey into the Arabian Desert of Egypt, and a vindication of genuineness of Verrazano's narrative, by Mr. R. H. Major.

The Municipal Council of Paris has voted, in accordance with the suggestion of M. Leverrier, a sum of 30,000 francs for the purpose of constructing precision clocks at the Exchange, Tribunal de Commerce, and Hôtel de Ville. A competition will be opened between the clock-makers. All these clocks are to be connected together electrically, and will distribute the time to the several parts of the city. The perplexing discrepancy between the different public clocks in Paris will be abolished entirely.

A meeting was held on Tuesday in connection with the proposal to establish a Museum of Hygiene at University College, London, as a memorial to the late Dr. E. A. Parkes, F.R.S. Subscriptions to the amount of 675*l.* were announced.

Mr. Prescott G. Hewitt, F.R.S., has been elected President of the Royal College of Surgeons for the ensuing year, in room of the retiring President, Sir James Paget.

At a recent meeting of the Paris Academy, M. Woillez described an apparatus which he calls a *spirophore*. It is for the resuscitation of asphyxiated persons, especially those who have been in danger of drowning, and newly-born infants. It consists of a sheet-iron cylinder, closed at one end. The body of the individual is introduced up to the neck, the aperture round which is then closed by a diaphragm. A strong bellows, containing more than 20 litres of air, situated without the case, communicates with this by a wide tube, and is worked by a lever, the descent of which causes the air to be drawn off from the case, while the return motion restores the air. Through a piece of glass in the cylinder, the chest and abdomen of the patient can be seen, and a rod, movable in a vertical tube, rests on the sternum. When a vacuum is made about the body by depressing the lever, the external air penetrates into the chest, the walls of which rise as in life. They return to their former position when the lever is raised, and these respiratory movements may be repeated fifteen to eighteen times a minute, as in a living man. By means of a tube communicating with a reservoir, and inserted in the windpipe, M. Woillez found that a litre of air, on an average, entered the air passages at each artificial inspiration, whereas the physiological average is only a demi-litre. Thus, more than a hundred litres of air can be passed through the lungs of an asphyxiated person in ten minutes. There is no danger of rupturing the lungs, however strongly the lever be wrought, for the force of penetration of the air is never superior to the weight of the atmosphere.

THE direction of plant-growth, it is known, is determined both by light and by gravity. The geotropism, or action of gravity exclusive of light has before been examined; and recently M. Müller (Thurgau), we learn from *Flora*, has endeavoured to study the converse fact of heliotropism, by excluding the influence of gravity as far as possible. He grew his plants in a cylinder rotating about its horizontal axis. The apparatus was so arranged that the light, coming through an aperture in the shutter of a dark room, fell parallel to the axis; the bendings observed were thus purely heliotropical. Among other results he found that only those zones which were not fully grown out, showed heliotropic bendings; that the most strongly growing parts of the stem were most sensitive to one-sided illumination; that the bending takes some (variable) time to manifest itself and continues some time after removal of the cause; that the rate of bending is at first slow, gradually increases to a maximum, and thereafter diminishes; that the bending is greater the intenser the light, &c.

IN the *Upsala Universitets Arsskrift* for 1874, Dr. Hamberg gives a most interesting paper, illustrated with eight coloured maps, on the night-frosts which have occurred in Sweden during 1871–72–73, from May 20 to September 30, or during that portion of the year of most interest to agriculturists. The observations of 285 Swedish observers are elaborately discussed, from which it appears that 80 per cent. of these frosts occur with northerly winds on the day preceding and on the days following them, but that during the night of the frost either the wind is very light or the air is calm. The map exhibiting the distribution of the spring frosts shows an abnormal excess on the south or lee side of the great lakes, arising, in all likelihood, from the low temperature of these lakes in spring. In autumn, on the other hand, when the temperature of the lakes is high, no such excess of frosts occur over the region south of them. One of the most striking results is the relatively small number of frosts over the district immediately to the north of Lake Wener, a result which may be due to the remarkable deflection of the wind in summer over this part of Scandinavia, so that winds are there south-westerly when they are north-westerly and westerly on the west of Norway. Six of the maps show well the intimate relation existing between the frosts and areas of high barometric pressure, and suggest that, if desired, the telegraph might be employed to give warning of these frosts, which are so destructive to vegetation.

THE *Supplemento alla Meteorologia Italiana* for 1875, fasc. iii., is entirely occupied with an exhaustive discussion of the temperature of Modena, by Prof. Ragona, director of the Royal Observatory there, based on the observations of the twelve years ending 1874. Among the more interesting points discussed with considerable fulness, are the anomalies of temperature which have occurred during the twelve years, particular attention being given to those anomalies which show a tendency to recur about the same dates from year to year. The prevailing winds at Modena are west and south-west from November to February and north-east during the other months, and the changes of these winds is a point of the greatest importance in their relations to the anomalies of temperature which accompany them. Fasc. iv. contains an account by P. A. Serpieri, director of the Observatory of Urbino, of the earthquake which occurred in the night of March 17–18, 1875; and a notice, by Almerico da Schio, of the stations established, or in the course of being established, in the province of Vicenza, for meteorological observations, or for observations of rainfall, of weather, or of the depth of the rivers. Upwards of sixty such stations are indicated on the map of the province accompanying the paper.

Two important publications, constituting Nos. 5 and 6 of the *Bulletin* of the U.S. National Museum, by Mr. G. Brown Goode, Assistant Curator of that establishment, have lately been published by the Interior Department. The first, a catalogue of the fishes of the Bermudas in the collection of the museum, gives the first complete account of the ichthyology of that portion of the world. These were principally obtained by Mr. Goode during a visit to the islands in the months of February and March, and are notes on the character of the species, containing many important facts in regard to their natural history. Seventy-five species in all were actually obtained, and the existence of others determined, but not established by specimens. A chief value of the paper is in the description of the colours of the fish while living, and the notes on their size and hints on their popular names, their capture, and economical value. The second publication was prepared by Mr. Goode as a classification of the collections made by the Smithsonian Institution and the United States Fish Commission for the Centennial Exhibition at Philadelphia.

THE additions to the Zoological Society's Gardens during the past week include two Royal Pythons (*Python regius*) from West Africa, presented by Mr. J. J. Kendall; a Greater Sulphur Crested Cockatoo (*Cacatua galerita*) from Australia, presented by Mrs. Baliol Scott; two Striped Hyænas (*Hyæna striata*), an Alligator (*Alligator mississippiensis*) from North America; two American White Cranes (*Grus americana*) from North America; a Green-winged Trumpeter (*Psophia viridis*) from Brazil, purchased; three Shoveler Ducks (*Spatula clypeata*) hatched in the Gardens.

SCIENTIFIC SERIALS

Journal of the Chemical Society, April.—A paper on oxynarcotine, a new opium educt, and its relationships to narcotine and narceine, is contributed by Dr. Wright and Mr. G. H. Beckett. This new body is obtained from an indistinctly crystalline mass, which, during the preparation and purification of narceine from opium liquors, is often left undissolved on boiling the partially purified narceine with water. This crude product contains the new opium alkaloid, bearing to narcotine the relationship of benzoic acid to benzoic aldehyde.—Dr. H. E. Armstrong and Mr. George Harrow contribute two papers: one on the action of potassic sulphite on the haloïd derivatives of phenol, the other on the action of nitric acid on tribromophenol. The length of the chemical names made use of in these papers is positively alarming, *e.g.*, dichlorophenolorthosulphonate and diorthobromoparanitrophenol.—Mr. Cornelius O'Sullivan contributes a paper on maltose, which is intended to show that maltose, obtained by the action of malt-extract on starch, is a simple body, isomeric with cane-sugar, and not a mixture of dextrin with dextrose, as M. Bondonneau, in a note recently presented to the Academy, regards it.—Mr. M. M. Pattison Muir, F.R.S.E., gives a method of estimating bismuth volumetrically. Potassium chromate or potassium dichromate solution is run into a nearly neutral solution of bismuth nitrate until the whole of the metal is precipitated in the form of chromate. The final point of the reaction is determined by the formation of red silver chromate, when a drop of